GEOMORPHOLOGY-HYDRAULICS TASKS

GEOMORPHOLOGY TOTAL COST ESTIMATE: **$1,152,429**

TASK #	FOUNDATION HYPOTHESIS	SUBHYPOTHESIS	INFORMATION/MODELING NEEDS	SUBTASKS	PRIORITY	ESTIMATED COST	RATIONALE	ASSUMPTIONS
G1-1	**Increasing and maintaining coarse sediment storage in mainstem Trinity River will create and maintain complex channel morphology**	*Transporting and routing coarse sediment delivered by tributaries at rate equal to input will create and maintain complex alluvial deposits*	Deadwood, Rush, Grass Valley, and Indian creeks: Flows, sediment transport monitoring, delta topography measurements, suspended sediment and turbidity monitoring	Continue helley smith bedload sampling, spot suspended sediment sampling, tributary delta topographic surveying, Hamilton Ponds topographic surveying, computations of total sediment yield from tribs. Add turbidity monitoring probes to gaging setups.	**High**	**$184,000**	Fundamental information needed to estimate how much coarse sediment is delivered to the mainstem Trinity River. Concern raised over variability of Helley Smith sampling results.	Taken from Stakeholder proposals-DO WE NEED TO ADD CABLEWAY BUDGET INTO THIS?
G1-2		*Transporting and routing coarse sediment, combined with gravel augmentation below Lewiston Dam, will create and maintain complex alluvial deposits*	Mainstem Trinity River: Coarse sediment transport monitoring at Lewiston cableway and Limekiln Gulch cableway	Continue helley smith bedload sampling, sieving coarse sediments greater than 2 mm, no suspended sediment or turbidty monitoring	**Low**	**$20,000**	The Lewiston Cableway location does not help much for predicting transport at tributary deltas, Limekiln is downstream of our initial coarse sediment management target (Rush Creek), could be useful for gravel augmentation and sediment transport model calibration	Assumed not included in Stakeholder Proposal above, assumed $10,000 each for Lewiston and Limekiln
G1-3		*Transporting and routing coarse sediment delivered by tributaries at rate equal to input will create and maintain complex alluvial deposits*	Mainstem Trinity River: Coarse sediment transport model from Lewiston to Salt Flat Bridge	Refine and calibrate existing hydraulic and sediment transport model, evaluate prepare proposed future modeling approach, send out for external peer review, incorporate comments into a new study plan for FY 2003	**Medium**	**$40,000**	First iteration of model will be done in FY 2001, need to evaluate model predictions and perhaps improve modeling technique at Rush Creek delta	USBR will be continuing this effort, have $40k funding for FY 2001, uncertain of needs for FY 2002 so assumed same value
G1-4		*Transporting and routing coarse sediment, combined with gravel augmentation below Lewiston Dam, will create and maintain complex alluvial deposits*	Mainstem Trinity River: Gravel augmentation (26,000 cu yds)	Introduce 26,000 yd3 of spawning gravel at locations identified in Trinity River Flow Evaluation Study	**High**	**$0**	Maximize implementation of Record of Decision	This is implementation task that is accounted for in Infrastructure-implementation sheet, so no funding allocated here.
G1-5		*Transporting and routing coarse sediment, combined with gravel augmentation below Lewiston Dam, will create and maintain complex alluvial deposits*	Mainstem Trinity River: planning for long-term program, gravel management plan	Build from HVT/TCRCD reconnaissance gravel management plan work funded in FY 2001 to: 1) develop gravel introduction methods, 2) develop designs for gravel intro equipment, 3) work with landowners in Gold Bar reach to aquire/purchase tailings, and begin planning for additional gravel introduction sites	**High**	**$80,000**	Develop infrastructure for long-term gravel augmentation, need to develop introduction equipment, need to work with regulatory agencies to simplify gravel introduction, need to secure long-term gravel sources.	Cost estimate very rough, assumes USBR does engineering work to develop better gravel intro machinery (majority of cost), assumes that RIG staff does landowner coordination, planning, and permitting
G1-6		*Transporting and routing coarse sediment delivered by tributaries at rate equal to input will create and maintain complex alluvial deposits*	Rush and Indian Creek: Delta investigation, design, permitting, evaluate sediment ponds, FY 2002 construction at Rush Creek	Take topographic data from 2001 Rush Creek and Indian Creek delta surveys, develop potential gravel excavation designs, evaluate whether sedimentation ponds are necessary w/respect to future flow regime, implement Rush Creek project in FY 2002 (but funded in I-22).	**Medium**	**$20,000**	Feeling is that Rush Creek delta will not restore itself on its own w/o mechanical alteration first, Indian Creek may be in the same predicament, evaluate need for alternative management strategies at tributary deltas	Assumes RIG staff does landowner coordination, planning, and permitting. Cost for Rush Creek is in Infrastructure-Implementation sheet. Could save money if combined with G1-4

G1-7		*Transporting and routing coarse sediment delivered by tributaries at rate equal to input will create and maintain complex alluvial deposits*	Rush and Indian creeks: Coarse sediment transport models through bedload measurement reaches	Use helley smith measurement, high flow hydraulic data, and sediment data to apply coarse sediment transport models to estimate coarse sediment entering mainstem from Deadwood, Rush, and Indian Creeks. Would also collect additional data in FY 2002	**Low**	**$50,000**	While it would be interesting to compare model predictions with Helley-Smith sampling or delta volume sampling results, it did not seem crucial for improved management.	Most data already available, so new data may not be required to perform tasks. Cost estimate is rough
G2-1	**Channel reconfiguration, periodic bar scour, bar redeposition, and channel migration will create and maintain complex channel morphology**	*Channel reconfiguration will create complex channel morphology*	Maintem Trinity River: Bank rehabilitation site planning, design, permitting, biological inventories, design data collection, right of way	Collect topography at first 14 bank rehab sites, develop designs, attend meetings, hydraulic modeling, design documentation, develop monitoring plans (but no monitoring)	**High**	**$0**	Need to continue developing infrastructure, conducting pre-construction data collection, preparing designs, and pursuing permit applications for implementation in FY 2003	Cost for planning and permitting included in Task I-25, Design is in Task I-27, so costs are zeroed out here. Assume topo and design work for two years worth of projects
G2-2		*Channel reconfiguration will create complex channel morphology*	Mainstem Trinity River: Establish baseline (pre-implementation) channel morphology and complexity at first bank rehabilitation sites	Channel geometry will be performed by Task G1-1. This would aid biological pre-construction survey, particle size sampling, development of complexity measures for 14 sites	**Medium**	**$140,000**	1991-1993 bank rehab site did not document pre-construction conditions, which made subsequent monitoring difficult. This prevents this oversight from occuring again.	Assumes two years worth of surveys done at $10,000 per site (cost estimate may be a bit too high)
G2-3		*Channel reconfiguration will create complex channel morphology*	Mainstem Trinity River: Establish baseline channel morphology and complexity at control sites	Channel geometry will be documented with total station survey, should include particle size sampling, development of complexity measures for the sites to compare with 14 project sites	**Medium**	**$40,000**	1991-1993 bank rehab site did not document pre-construction conditions or control site conditions, which made subsequent monitoring difficult. This prevents this oversight from occuring again.	Assumes only four control sites at $10,000 per site
G2-4		*High flows will cause periodic bed mobilization, bar scour/redeposition, and channel migration to create and mainatain complex channel morphology*	Mainstem Trinity River and downstream tributaries: Flow monitoring to establish cause and effect with flow magnitude, duration, timing, and frequency	Maintain existing gaging stations at Lewiston, Limekiln Gulch, Douglas City, Junction City, Burnt Ranch, Weaver Creek, NF Trinity, Canyon Creek, Browns Creek	**High**	**$373,429**	Need to establish cause and effect of restoration activities with flows; thus, a critical component of overall monitoring program.	Taken from TYAP, Not sure if all DWR funds are needed for installation.
G2-5		*High flows will cause periodic bed mobilization, bar scour/redeposition, and channel migration to create and mainatain complex channel morphology*	Mainstem Trinity River: Geomorphic monitoring at 1991-1993 bank rehabiliation sites to evaluate whether tributary generated high flows in the mainstem exceed bed mobility/scour thresholds	Channel geometry monitoring with cross sections or total station, scour cores, marked rocks at all nine sites	**Low**	**$100,000**	No bank rehab sites are planned for construction in FY 2002, and we have data already for existing bank rehab sites, so low priority	From TYAP
G3-1	**Reduction in fine sediment storage in mainstem Trinity River will improve aquatic habitat quality and quantity, and increase salmonid smolt production**	*Reducing fine sediment delivery by Grass Valley Creek will reduce fine sediment storage in mainstem Trinity River*	Grass Valley Creek: Hamilton Ponds stand-by for large storm maintenance	Topographic monitoring to quantify volumes, contract dredging of ponds on short notice such that ponds can be excavated immediately after a high flow fills them with fine sediment	**High**	**$0**	High flows in Grass Valley Creek in 1995 and 1997 completely filled Hamilton Ponds, such that subsequent storm events delivered large volumes of sand to the Trinity River. Need to quickly do emergency evacuation of sedimentation ponds after a high flow to maintain sediment trap efficiency.	Cost incorporated in Infrastructure tasks
G3-2		*Reducing fine sediment delivery by Grass Valley Creek will reduce fine sediment storage in mainstem Trinity River*	Grass Valley Creek: Evaluate performance effectiveness of watershed rehabilitation activities	Review all watershed rehabilitation activities, evaluate with respect to fine sediment reduction, successes/failures, costs, and other measures (e.g., sedimentation basins)	**Medium**	**$20,000**	With Hamilton Ponds and Buckhorn Dam trapping fine sediment, watershed restoration efforts in GVC may be better spent in other watersheds without sediment traps (e.g., Indian Creek).	Outside peer review, cost is rough

G3-3	*Reducing fine sediment delivery by Grass Valley Creek and increasing mainstem Trinity River transport will reduce fine sediment storage in mainstem Trinity River*	Mainstem Trinity River: Quantify fine sediment storage and distribution in mainstem (pools, bars, riffles, banks, spawning gravel)	Identify index reaches where fine sediment storage can be tracked with time, including that stored in pools, banks, spawning gravels, etc., to develop and track an index of fine sediment storage to evaluate effectiveness of fine sediment reduction efforts	**Medium**	**$75,000**	Establish baseline conditions to evaluate impact of flow and fine sediment reduction efforts on fine sediment storage in channel. Fine sediment storage in spawning areas provides input data to SALMOD.	Rough cost estimate of three sites @ $25,000 each
G3-4	*Reducing fine sediment delivery by Grass Valley Creek and increasing mainstem Trinity River transport will reduce fine sediment storage in mainstem Trinity River*	Mainstem Trinity River: Fine sediment transport monitoring at Lewiston cableway and Limekiln Gulch cableway	Helley Smith bedload sampling during moderate and high flow events, sieve down to finer grain sizes, collect suspended sediment samples (although of marginal use due to variability of dam releases vs tributary floods)	**Low**	**$10,000**	Previous sampling at Lewiston shows virtually no fine sediment in transport due to lack of supply from upstream tributaries, Limekiln may be useful in showing decrease transport as a function of decreasing mainstem storage. However, if coarse sediment is measured at either, fine sediment should be done as well due to incrementally small cost. Flood events such as 1/1/97 can cause the reservoir to become extremely turbid and add suspended sediment for several months, therefore, a turbidity probe should be added to one of the gaging stations.	Cost estimate based on coarse sediment transport measurements is conducted at the cableways. If coarse sediment is done, then fine sediment should also be done because additional cost is insignificant.